

Course Syllabus

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ARCH A6764

Basic Conservation Science

Wednesdays 2:00-6:00 PM

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Spring 2017

Description

This course presents the basic principles of conservation science of architectural materials and serves as the foundation for subsequent material-based conservation courses such as: 1. Architectural Metals, 2. Concrete, Cast Stone and Mortar, 3. Brick, Terra Cotta and Stone, 4. Architectural Finishes in America, and, 5. Wood. The initial lectures focus on developing the fundamental scientific language for the study of inorganic materials that are explored in the following weeks through lectures, demonstrations, and laboratories. The pattern is repeated for organic materials later in the semester: lectures on fundamental scientific language followed by lectures, demonstrations and laboratories on paint, clear finishes and wood.

Readings and Assignments

Readings, laboratory instructions and assignments for each class are posted to the course website.

Grades

Attendance & class participation	20%
Assignments/Quizzes	20%
Laboratory Reports	20%
Examinations	40%

Schedule

Class 1: Lecture: Periodic Table; elements & chemical symbols; oxidation numbers; ions, cations & anions; chemical formulas; chemical equations & related symbols; molecular mass (weight) & molarity; other expressions of concentration; saturation; pH & acids, bases & salts; electronegativities; bond & compound types

Class 2: Lecture: metallic bonding; conductivity; density, opacity & lustre; alloys; processing

Laboratory: metal identification using XRF, microchemical testing & physical properties

Class 3: Lecture: electrode potentials & corrosion/protection of metals; mechanical properties of architectural materials

Class 4: Laboratory: preparation of mortars;

Lecture: the lime “cycles”; carbonation vs. hydration; cement chemistry

Class 5: Laboratory: mortar characterization – acid digestion

Class 6: Lecture: aggregates & additives; concrete – pH & alkalinity; water absorption techniques, porosity & permeability

Class 7: Lecture: rock/stone mineralogy & rock identification

Laboratory: x-ray diffraction of stone, mortar, & salts

Class 8: Laboratory: polarizing light microscopy, mineral & rock; identification, microscopy & chemistry of mortars

Class 9: Laboratory: compatibility of mortars & substrates

MID-TERM EXAMINATION

Class 10: Lecture: organic bond types; chemical groupings & basic properties of organic materials including solvents, oils, natural & synthetic resins, gums & cellulosic materials

Class 11: Lecture: paint terminology, film thickness, mechanisms of film formation

Laboratory: hiding power & refractive index

Lecture/Demonstration: colorimetry

Class 12: Lecture and Laboratory: pigments & pigment identification

Class 13: Lecture/Demonstration: identification of paint media & clear coatings

Class 14: Lecture: wood chemistry & properties; wood treatments

FINAL EXAMINATION

Assignments Summary: